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DEPARTMENT OF THE NAVY
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From: Commanding Officer, Navy Environmental Health Center
To: Commander, Atlantic Division, Naval Facilities Engineering Command,
Code 1822, Norfolk, VA 23511-6287

Subj: MEDICAL REVIEW OF INSTALLATION RESTORATION PROGRAM
DOCUMENTS FOR MARINE CORPS BASE, CAMP LEJEUNE, NORTH
CAROLINA

Encl: (1) Emergency Response Plan Review
(2) Radiation Safety Plan Review
(3) Medical Surveillance Plan Review

1. Medical review of the emergency response, radiation safety, and medical surveillance sections for Draft Health and Safety Plan, Sites 6, 9, 48, and 69, Camp Lejeune, North Carolina has been completed. Our comments are provided in enclosures (1) through (3). Review of complete health and safety plan is being submitted under separate cover.

2. The technical points of contact for comments on the reviews are noted in the enclosures. We are available to discuss the enclosed information by telephone with you and, if necessary, with you and your contractor. If you require additional assistance, please coordinate with Ms. Sheila Muschett, P.E., Head, Installation Restoration Program Support Department at 444-7575, extension 430.

G.E. Williams
G. E. WILLIAMS
By direction

EMERGENCY RESPONSE PLAN REVIEW

GENERAL COMMENTS:

1. The "Draft Final Health and Safety Plan, Sites 6, 9, 48, and 69, Camp Lejeune, North Carolina" was prepared for Atlantic Division, Naval Facilities Engineering Command (LANTNAVFACENGCOM) and received directly by the Navy Environmental Health Center (NAVENVIRHLTHCEN) from the contractor on 6 May 1992. The document was prepared for LANTNAVFACENGCOM by Baker Environmental, Inc. and dated 10 April 1992.

2. This review addresses the emergency response sections of the plan. The radiation safety plan and medical surveillance plan reviews are provided as separate enclosures. Review of the complete health and safety plan is being submitted under separate cover.

3. The point of contact for review of the emergency response plan is Commander Gary E. Williams, MSC, USN, Deputy Director for Environmental Programs, who may be contacted at 444-7575, extension 399.

SPECIFIC COMMENTS:

1. Under Section 11.3, "Emergency Medical Care" is included most of the emergency response information. Other sections/paragraphs have pertinent information as indicated below. Comments and recommendations refer to the sections/paragraphs as noted.

2. Page 9, Section 4.0 "Site Organization and Coordination":

COMMENT: The listed points of contact do not include a representative from the Navy Medical Department, the Navy/Marine Corps On-Scene Coordinator/Commander, the Hazardous Materials Team, the civilian hospital and ambulance service, and the local and/or state agencies for emergency response such as the Local Emergency Planning Committee established under SARA Title III.

RECOMMENDATION: Revise the section to clearly list points of contact for emergency response. Ensure the Department of the Navy chain of command under the Navy/Marine Corps On-Scene Coordinator/Commander, the Navy Medical Department, and/or the local base Hazardous Materials Team are listed. Ensure that points of contact for state and local agencies for emergency response are included. Ensure that the civilian hospital and ambulance service points of contact are included.

3. Page 31, Paragraph 11.3.1 "Emergency Facilities":

COMMENTS:

a. The Navy Medical Department is listed as providing ambulance and medical treatment facility support without indication of the level of care available at the military hospital. The section indicates that "contact should be made...prior to the start of the activities" with the emergency response personnel. A civilian hospital and ambulance service are listed. The basis under which the Navy Medical Department is to provide medical care is not stated, that is, whether or not contractor personnel are to be rendered assistance under civilian humanitarian or by other agreement. No indication is provided that the military ambulance crew has been trained to respond to potential hazardous waste site emergencies or that a point of contact within the Navy Medical Department has been provided technical information about the potential chemical hazards.

b. A telephone conversation with the civilian hospital Emergency Department charge nurse indicated that, while the department had a plan for response to contaminated patients, she was not aware of any specific chemical hazards information which might have been provided by the contractor.

c. A telephone conversation with a qualified ambulance crew member from Naval Hospital, Camp Lejeune indicated that the ambulance crews did not have any specific orientation, equipment, and/or training for response to the sites beyond that received in basic emergency medicine technician training. The corpsman did indicate that the federal fire department functioned as first responders and had generic technical information about hazardous materials. Also, the corpsman indicated that the hospital emergency service was contractor operated and he was not aware of any specific procedures for contaminated patients which are used at the hospital.

RECOMMENDATIONS:

a. Clarify emergency response procedures. Provide a plan, as needed, for trauma patients. Note in the plan under what circumstances civilian vice military medical support should be requested. The procedures by which the contractor is to notify the ambulance crew that their response is to a hazardous waste site should be noted. The specific arrangements for medical support by the Navy Medical Department should be delineated. A Navy Medical Department point of contact should be listed and that point of contact should be noted as having been provided technical information about the potential chemical hazards. Ensure that the civilian hospital and ambulance service have been provided technical information about the potential chemical hazards.

b. Ensure emergency response personnel and facilities are trained and equipped to respond to contaminated patients.

3. Page 32, Section 11.3.2, "Emergency Phone Numbers":

COMMENT: A nationally recognized agency for additional support such as a regional poison control center or the Agency for Toxic Substances and Disease Registry is not listed.

RECOMMENDATION: Revise the section to include appropriate telephone numbers to include nationally recognized agencies for additional support.

4. Page 48, Section 14.0, "Spill Containment Procedures":

COMMENT: The section indicates that in the event of a spill "appropriate Navy Activity Personnel will be notified.."

RECOMMENDATION: Revise the section include specific procedures to follow in the event of a spill to include coordination with the Navy/Marine Corps On-Scene Coordinator/Commander.

SUMMARY COMMENTS:

1. The plan has limited information and is not judged to provide adequate site-specific information appropriate to protection of the worker's health in an emergent situation. The plan does not include all information required for an emergency response plan. The lack of coordination with the Navy/Marine Corps On-Scene Coordinator/Commander chain of command and the Navy Medical Department indicates that the contractor has not thoroughly evaluated site-specific requirements prior to submission of the plan to the Department of the Navy.

2. The plan should be rewritten to ensure consistency with 29 CFR 1910.120 and the Navy/Marine Corps Installation Restoration Manual (February 1992) and to provide site-specific information. The various sections in the Health and Safety Plan which have emergency response information should be combined into one comprehensive plan. In addition to the comments above, the rewrite should include the following:

a. Indication that military and civilian medical treatment facilities and ambulance services have been specifically integrated into the contractor's emergency response plan. A description of the administrative arrangements for accepting patients. A listing of the procedures to prevent contamination of medical personnel, equipment, and facilities.

b. Indication that the Navy/Marine Corps On-Scene Coordinator/Commander procedures have been incorporated into the site-specific contractor plans.

c. Indication by specific maps and written descriptions that safe distances and places of safe haven have been identified.

d. Indication that the emergency response plan has been coordinated with state and local disaster authorities and/or emergency response personnel.

e. Listing of the procedures and frequency by which the contractor intends to rehearse the emergency response plan.

f. Listing of the procedures and frequency by which the contractor intends to review the emergency plan.

g. Name, *street address*, and telephone number for the supporting medical treatment facilities.

h. An assessment of the medical treatment facilities ability to provide care and treatment of personnel exposed and/or suspected of being exposed to toxic substances.

i. A description of procedures for the rapid identification of the substance to which a worker may have been exposed.

3. Comments provided by the NAVENVIRHLTHCEN in November 1991 about the preliminary draft plan were not reflected in this draft final plan.

RADIATION SAFETY PLAN REVIEW

GENERAL COMMENTS:

1. The "Draft Final Health and Safety Plan, Sites 6, 9, 48, and 69, Camp Lejeune, North Carolina" was prepared for Atlantic Division, Naval Facilities Engineering Command (LANTNAVFACENGCOM) and received directly by the Navy Environmental Health Center from the contractor on 6 May 1992. The document was prepared for LANTNAVFACENGCOM by Baker Environmental, Inc. and dated 10 April 1992.
2. This review addresses the radiation safety sections of the plan. The emergency response plan and the medical surveillance plan reviews are provided as separate enclosures. Review of the complete health and safety plan is being submitted under separate cover.
3. The point of contact for review of the radiation safety plan is Commander Gary E. Williams, MSC, USN, Deputy Director for Environmental Programs, who may be contacted at 444-7575, extension 399.

SPECIFIC COMMENTS:

1. Under Section 6.4, "Radiation Hazard Analysis" is included a discussion about radiation protection. Other sections have pertinent information as indicated below. Comments and recommendations refer to the sections/paragraphs as noted.

1. Page 21, Section 6.4, "Radiation Hazard Analysis":

COMMENTS:

a. The section does not provide site-specific information about potential radiation sources or radioactivity; rather, the section gives a generic discussion of different types of ionizing radiation. Without a specific discussion of the previously identified and/or suspected radionuclides, a radiation hazard analysis is not feasible.

b. As an example, consider possible health-related concerns for uranium which can be considered either a chemical or radiologic hazard depending on its isotopic composition and radiation history. In acute or sub-acute uranium poisoning, the kidney is the first organ to show biological effects in the form of nephritis and proteinuria (kidney-related medical problems). These effects are from the chemical hazard and not from a

potential radiation hazard. Also, the chemical form and solubility of radionuclides has a significant influence on the efficacy of possible medical treatments in a contamination situation. [See National Council on Radiation Protection and Measurements Report Number 65 "Management of Persons Accidentally Contaminated with Radionuclides" for additional technical information.]

c. The third paragraph is not consistent with other portions of the document in that "intermittent monitoring" is discussed as a control measure while in following sections such as Table 11.2, "intermittent and continuous monitoring" are indicated as requirements. The paragraph does not provide adequate distinction between the use of protective clothing to reduce potential radioactive contamination and the use of other protective measures to reduce potential external radiation exposure.

RECOMMENDATIONS:

a. Rewrite the section to clearly describe site-specific hazardous analysis for potential radiation sources and/or radioactivity. Information should include, but not be limited to, the following: specific radionuclide(s), chemical form and solubility, expected and/or potential external exposure rates, expected and/or potential radionuclide activity, and usual radionuclide(s) and their activity found in the environment.

b. Revise the third paragraph as indicated.

3. Page 34, Paragraph 11.3.4, "Substance-Specific Information":

COMMENT: The paragraph indicates that emergency medical information for substances "observed or detected" at the sites is provided in Table 11-1. The table does not include information on potential radiation sources and/or radioactivity.

RECOMMENDATION: Revise the table to include information for potential radiation sources and/or radioactivity.

4. Page 34, Paragraph 11.4.1, "Point Source":

COMMENTS:

a. The paragraph provides information on equipment for environmental monitoring with following tables indicating monitoring frequency at specific sites.

b. The radiation survey meter is listed as a Victoreen Model 450. This meter provides readings as subunits of R and the contractor plans to use the meter for monitoring alpha, beta, and gamma radiation. Usual health physics practice and contamination

control procedures is to evaluate alpha and beta radioactivity in the contamination units of disintegrations per minute (dpm). Measurement of contamination in dpm is possible at significantly lower levels than measurement of contamination in subunits of R.

c. The apparent control measurements listed under the heading for the survey meter are not consistent with the "Radiation Hazard Analysis" section. A reading of 1 mR/hr to 2 mR/hr is indicated as a basis to leave the area whereas Section 6.4 indicated that readings above 1 mR/hr were an indication to stop work. The lower action levels which have associated requirements for wearing protective equipment are not consistent with the As Low As Reasonable Achievable or ALARA concept since the levels are not related to an evaluation of site-specific potential radiation levels and do not provide for contamination measurements in appropriate units of dpm.

RECOMMENDATIONS:

a. Revise the radiation survey equipment to include a survey meter for external radiation exposure levels in subunits of R and a contamination survey meter in units of dpm.

b. Establish action limits based on site-specific conditions. Ensure the action levels are consistent throughout the plan and reflect the ALARA concept.

5. Page 43, Paragraph 11.4.2, "Perimeter Monitoring"

COMMENT: The survey meter is indicated as being used for establishing the boundaries of radioactivity if a point source is identified. Since the Victoreen survey meter is required to be within 3 mm of the source to evaluate alpha contamination, the use of the listed meter is not practical for area surveys. Also, the paragraph does not indicate the basis for establishing boundaries.

RECOMMENDATION: Revise the section to include appropriate survey meters for area alpha surveys in contamination units of dpm. Determine acceptable criteria for establishing radiation area boundaries in contamination units of dpm and radiation exposure levels in subunits of R.

6. Page 44, Section 11.5, "Personal Monitoring":

COMMENT: The section does not discuss possible monitoring for external radiation exposure.

RECOMMENDATION: Include in the "Radiation Hazard Analysis" section a discussion of possible personal monitoring for external

radiation exposure. [Note: Dosimetry for external radiation exposure is most likely not indicated by the potential for radiation exposure.]

7. Page 39, Table 11.2, "Monitoring Equipment and Frequency For Site 6":

COMMENT: The table lists survey frequency for various job tasks. The requirements for radiation surveys appear to be related to environmental radioactivity (or naturally occurring radioactive material) during subsurface operations. The third sentence in Note (2) indicates that, while using the radiation survey meter, the instrument should be held at the survey point until the instrument responds. For surveys at non-contaminated locations, the surveyor might have a rather long wait.

RECOMMENDATION: Ensure the "Radiation Hazards Analysis" sections includes a discussion about the technical basis for survey requirements including pre-established action levels for survey results. Change Note (2) to caution the surveyor to follow the manufacturer's instructions for using the survey equipment with particular emphasis on the "time constant" for meter response.

8. Pages 40-42, Tables 11.3, 11.4, and 11.5:

COMMENT: See Comment 7 above.

RECOMMENDATION: See Recommendation 7 above.

9. Attachment B, "OSHA Training History of Baker Project Personnel":

COMMENT: Radiation safety training is not included for site workers.

RECOMMENDATION: Evaluate the need for radiation safety training for site workers in the "Radiation Hazards Analysis". Consider sending selected personnel to the Environmental Protection Agency course "Radiation Safety for Superfund Sites" (165.11).

SUMMARY COMMENTS:

1. The plan does not include site-specific information about potential and/or actual radiation hazards. The section for "Radiation Hazards Analysis" should be extensively revised to address issues noted above.

2. The radiation safety sections are not considered adequate to provide for site-specific health physics standards of practice

and protection of the worker's health and safety. The plan does not include sufficient information for informed judgments by the reviewer about the radiation safety sections. The use of inappropriate survey equipment and terminology indicates a lack of understanding of radiation safety issues.

3. The plan should be rewritten to ensure consistency with 29 CFR 1910.96 and health physics standards of practice and to provide site-specific information.

MEDICAL SURVEILLANCE PLAN REVIEW

GENERAL COMMENTS:

1. The "Draft Final Health and Safety Plan, Sites 6, 9, 48, and 69, Camp Lejeune, North Carolina" was prepared for Atlantic Division, Naval Facilities Engineering Command (LANTNAVFACENGCOM) and received directly by the Navy Environmental Health Center from the contractor on 6 May 1992. The document was prepared for LANTNAVFACENGCOM by Baker Environmental, Inc. and dated 10 April 1992.
2. This review addresses the medical surveillance sections of the plan. The emergency response plan and radiation safety plan reviews are provided as separate enclosures. Review of the complete health and safety plan is being submitted under separate cover.
3. The point of contact for review of the medical surveillance plan is Commander Gary E. Williams, MSC, USN, Deputy Director for Environmental Programs, who may be contacted at 444-7575, extension 399.

SPECIFIC COMMENTS:

1. Section 1.3 "Medical Surveillance Requirements" provides information and guidelines for medical surveillance. Attachment A "Medical Surveillance Testing Parameters" provides a matrix for medical surveillance procedures for various worker categories. Comments and recommendations refer to the sections/paragraphs as noted.
2. Page 1, Section 1.3, "Medical Surveillance Requirements", first and second paragraphs:

COMMENT: The first paragraph indicates that medical surveillance is for "project personnel". The paragraphs do not establish site-specific plans for medical surveillance rather the information is generic in nature. The discussion does not indicate a method by which workers are to be placed into categories for medical surveillance or how the on-site management staff is to verify worker examination results and, most importantly, the examining physicians written opinion about any recommended work limitations.

RECOMMENDATION: Ensure the requirements of 29 CFR 1910.120(f) are addressed. Revise the section to require the on-site management staff to identify workers engaged in site activities by medical surveillance category and to then verify that the contractor's records and/or examining physician's

written opinion about the individual worker is consistent with the identified site activities. Include in the paragraph a more specific delineation of personnel who are required to be under medical surveillance.

3. Page 3, Section 1.3, "Medical Surveillance Requirements," third paragraph:

COMMENT: The paragraph discusses requirements for subcontractor personnel. These requirements do not appear to be different from those discussed in the first paragraph. Since the first paragraph indicates that "project personnel" are included in medical surveillance, the purpose of the second and third paragraphs is not clear.

RECOMMENDATION: Ensure the requirements of 29 CFR 1910.120(f) are addressed. Clarify the purpose of the paragraph. See Comment 1 above.

4. Attachment A, "Medical Surveillance Testing Parameters":

COMMENTS:

a. General: The EKG requirement is listed for workers over age 30 while the usual age listed in occupational medicine is over age 34. Pulmonary function is not noted to be limited to spirometry while the usual practice is to indicate "spirometry only, unless otherwise indicated." Chest radiography is not indicated to be age related but is listed for biannual while usual practice is to perform chest radiography based on age and at a lesser frequency, unless clinically indicated.

b. Group II: The SMA 20 or 24 is considered to be too comprehensive; liver enzymes evaluation, CR, and BUN are the usual laboratory tests.

c. Group III: Although biological monitoring is a useful adjunct, the tests to be completed should be specific and exposure related.

d. Group IV: Chest radiography is usually age related unless the worker have had a long exposure history (> 20 years) and then frequency is usually annual.

RECOMMENDATION: Revise medical surveillance testing parameters to ensure that medical histories/examinations are "targeted" with biological monitoring based on documented, preset field exposure to hazardous materials. Revise chest radiography, spirometry, and other tests as indicated.

SUMMARY COMMENTS:

1. While 29 CFR 1910.120(f) allows for the "attending physician" to determine the content of the medical surveillance examination, the proposed medical surveillance program appears to be inordinately comprehensive. The scope of the recommended examinations and tests exceeds the guidelines followed in the medical surveillance of Department of the Navy active duty and civilian personnel performing identical job taskings.

2. Current Navy Medical Department occupational health surveillance is comprised of targeted medical history and physical examinations performed on workers with specifically identified job taskings and exposures. These guidelines are supported by experience and scientific review; deviation from these targeted protocols add little to the overall assessment of the worker's health. The guidelines provide for cost effective, complete medical surveillance and are considered to be consistent with 29 CFR 1910.120(f).

3. The contractor's medical surveillance guidelines and procedures should be revised to ensure consistency with 29 CFR 1910.120(f) and to conform to cost effective, targeted examinations.